

A GYNANDROMORPH OF *ECTOPSOCUS AUSTRALIS*
SCHMIDT & THORNTON (PSOCOPTERA:
ECTOPSOCIDAE) FROM AUSTRALIA

C.N. SMITHERS

Research Associate, Australian Museum, College St., Sydney, N.S.W. 2000

Abstract

A gynandromorph specimen of *Ectopsocus australis* Schmidt & Thornton is recorded. Functional ovaries are present but testes are absent. A slightly abnormal male clunium and complete sets of both male and female genitalia are present. There appears to have been only one previous record of a psocopteran gynandromorph.

Introduction

Badonnel (1986) described the only recorded gynandromorph of the Psocoptera, a predominantly male specimen of *Peripsocus potosi* Mockford from Guadaloupe. Gynandromorphy involved only the head, which showed female characters on the right side and male on the left.

This note records a gynandromorph of *Ectopsocus australis* Schmidt & Thornton. The presence of clunial sclerites indicated that the specimen was a male but closer inspection revealed that the abdomen contained several large eggs and that there were two sets of external genitalia, one male and one female.

The gynandromorph of *Ectopsocus australis*

Material examined. 1 specimen, Tuglo Wildlife Refuge (32°14'S, 151°16'E), 49 km N. Singleton, New South Wales, 5.v.1991, A.S. Smithers (in Australian Museum). The gynandromorph was taken in company with 9 normal males and 8 normal females.

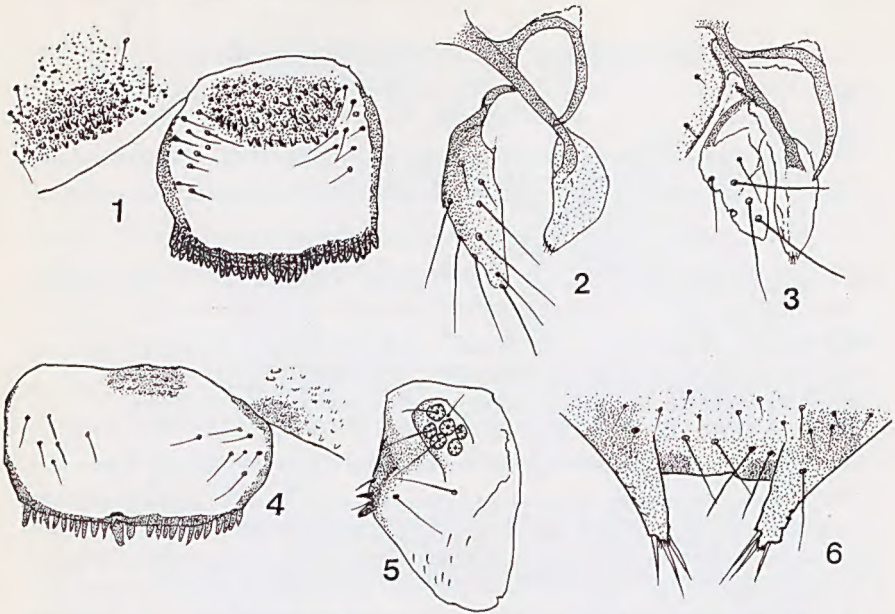
Description. There is some sexual dimorphism in fore wing markings in this species, the females having small areas of diffuse dark pigment at the ends of the main veins, the intersection of Rs and M and at each end of the pterostigma. Some males have wings similar to those of females, some have reduced markings and some are without pigment. The wing of the gynandromorph is similar to that of normal females. The presence of mature eggs implies functional ovaries. There is no sign of testes nor of seminal vesicles. The dorsal ornamentation of the posterior tergites (fig. 4, slightly flattened in preparation) resembles, but is not identical to, that of a normal male (fig. 1). The anteriorly placed spiculate area is reduced and has fewer and smaller spicules than usual. The transverse comb along the hind margin is well developed but abnormal in that there are fewer teeth and some near the midline are larger and irregularly placed. In a normal comb the teeth are more regularly arranged but by no means even and tend to be a little longer laterally than medially in some specimens. In the gynandromorph the lateral spiculate fields (fig. 4) are less extensive and the spicules are smaller than normal (compare figs 1 and 4). Clunial ornamentation is absent from normal

females. The epiproct resembles that of a normal male but the arrangement of setae is not precisely the same as usual. The right paraproct (fig. 5) is slightly abnormal in having only six trichobothria. The normal number is eight, sometimes nine, in both sexes. There is one large seta below the trichobothrial field, the usual male condition; females have a row of four. There is a narrow, simple, glabrous plate in the position usually occupied by the hypandrium. The hypandrium in normal specimens is setose with a slightly thickened margin. The phallosome is identical to that of a normal specimen, confirming the identity of the specimen as *E. australis*.

The female genitalia are represented by the subgenital plate (fig. 6, gynandromorph), of almost normal form but lightly sclerotised, and a set of gonapophyses on each side (fig. 3, right gonapophyses). The dorsal valves are of approximately normal shape and size. The external valves are very lightly sclerotised and reduced, having the appearance of fleshy lobes, but bearing some well developed setae (compare figs 2 (normal female) and 3 (gynandromorph)). The ventral valve is lightly sclerotised and proportionate to a normal dorsal valve (compare figs 3 (gynandromorph) and 2 (normal female)). The sclerification to the entrance to the spermatheca ("spermathecal sac" of Schmidt and Thornton 1992) is absent.

Measurements of the specimen are as follows (with those given by Schmidt and Thornton (1992) for male and female in parentheses). Fore wing length: 1.89 mm. (2.21, 1.62). Hind leg measurements: F: 0.34 mm. (0.41, 0.38); T: 0.6 mm. (0.72, 0.63); t1: 0.18 mm. (0.245, 0.190); t2: 0.08 mm. (0.091, 0.087); rt: 2.2:1 (2.7:1, 2.2:1); ct. 10,0 (15,0, 12,0). IO/D (Badonnel): 2.3; PO: 0.83 (Schmidt and Thornton used Pearman's method of measuring the IO/D ratio). IO/D (Pearman): 2.8 (3.5, 8.5). The ratio of 8.5 in the original description indicates an extremely small female eye in the specimen measured by Schmidt and Thornton (1992). Females associated with the gynandromorph have an IO/D ratio within the range 3.0 - 3.5.

Discussion. The nature of the origin of the gynandromorphy of the specimen is a matter for conjecture. The female ovaries have replaced male testes and seminal vesicles. As far as external genitalia are concerned almost all elements of both sexes are represented. The upper side of the insect has all the male features and the lower side retains the male hypandrium as a glabrous plate. There are some deformities in the male spiculate areas and dorsal comb and the epiproct and paraprocts also carry minor deformities, but all remain essentially male in character. The reduced external valve of the gonapophyses shows the greatest departure from normality of the female features. The complex sclerifications of the male phallosome are retained without obvious modification but the entrance to the spermatheca is not surrounded by sclerotisations. All measurements approach those of females rather than males other than that of the IO/D ratio, which is closer to that of the male measured by Schmidt and Thornton (1992) although this



Figs 1-6. *Ectopsocus australis*: (1) Posterior abdominal tergites, normal male; (2) Right gonapophyses, normal female; (3) Right gonapophyses, gynandromorph; (4) Posterior abdominal tergites, gynandromorph (slightly flattened in preparation); (5) Right paraproct, gynandromorph; (6) Subgenital plate, gynandromorph.

measurement is closer to females of the series associated with the gynandromorph.

Gynandromorphy seems to be extremely uncommon in the Psocoptera. The manifestation of the phenomenon involving all the genital structures is more extensive in the *E. australis* specimen than in that of *P. potosi* (Badonnel 1986). Schmidt and Thornton (1992, pp. 162-166, figs 70-79) describe and illustrate parts of both sexes of normal *E. australis* relevant to this discussion.

Acknowledgment

The specimens amongst which the gynandromorph was found were collected by my wife during a survey of the Psocoptera of Tuglo Wildlife Refuge.

References

- BADONNEL, A. 1986. Description du mâle de *Peripsocus potosi* Mockford, un curieux cas de gynandromorphisme (Psocoptera, Peripsocidae). *Revue française d'Entomologie* 8: 7-99.
- SCHMIDT, E.R. and THORNTON, I.W.B. 1992. The Psocoptera (Insecta) of Wilsons Promontory National Park, Victoria, Australia. *Memoirs of the Museum of Victoria* 53: 137-220.